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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/773,733	02/05/2004	Kyung-Ho Yoon	04-156	8603
34704	7590	12/20/2005	EXAMINER	
BACHMAN & LAPOINTE, P.C. 900 CHAPEL STREET SUITE 1201 NEW HAVEN, CT 06510			MONDT, JOHANNES P	
			ART UNIT	PAPER NUMBER
			3663	

DATE MAILED: 12/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/773,733

Applicant(s)

YOON ET AL.

Examiner

Johannes P. Mondt

Art Unit

3663

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10/24/05 (RCE).
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2/5/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/24/05 has been entered.

Information Disclosure Statement

The (new) examiner has considered the items listed on the Information Disclosure Statement filed 2/5/04. Enclosed please find a signed copy of substitute Form PTO-1449.

Response to Amendment

Amendment under 37 CFR 1.116 filed 10/24/2005 has been entered in light of aforementioned Request for Continued Examination.

In said Amendment Applicants substantially amended all previously outstanding claims 1-6 and added new claims 7 and 8. Applicant also submitted Replacement Sheets for Drawings of Figures 4, 5A, 5B, 6, and 8. Applicant also submitted amendments to the Specification.

Comments on Remarks submitted with said Amendment are include below under "Response to Arguments".

Drawings

1. Figures 1, 2A, 2B, 3A and 3B should be designated by a legend such as -- Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.
2. The proposed drawing changes have not been approved as they are drawn to new matter.

The original disclosure does not specifically state that each of the four sides or perimeter strips of the grid, made up of a plurality of separate individual portions which are welded or somehow joined together to form each of the four sides of the grid as shown for example in Figure 5B. Note, for example, that it is conventional to form each of the four outer sides of the grid as a single strip, as shown for example in Fromel et al (4,683,115) or Steven et al (4,705,663). Further, the prior art strips of the grids, shown in Figures 1, 2A, 2B, 3A and 3B of Applicants' specification, appear to show the same construction as Applicants' inventive strips (Figures 4, 5A and 5B).

Specification

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

1. No new matter should ever be introduced into the specification.

Applicants' amendment to the specification does so unless (a) "equiangular" and "conformal", and "unit strip" and "cell wall" would not have patentably distinct meanings, and unless (c) "perimeter strips encircling intersecting inner strips" (page 12 of amended specification) would have been disclosed before, in which case there is no need for said amendment to the specification. New examiner cannot find, in the record of cited interview (Interview Summary mailed 6/13/05, any agreement on amendment to the specification of any kind.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. ***Claims 1-8*** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contain subject matter which was not described in the specification in such a way

as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. In particular, "perimeter strips encircling the intersecting inner strips" (claim 1, lines 7-13) has not been disclosed in the specification as originally filed.

1. **Claims 7-8** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.

The claims contain subject matter not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. In particular, the spacer grid according to claim 1, - hence comprising grid springs on each of the cell walls (i.e., including intermediate cell walls, inter alia) and further comprising inner grid springs on inner strips forming said intermediate cell walls as recited through claim 7, while claim 8 is dependent upon claim 7, has not been disclosed in the original specification inclusive of original claims, and accordingly must be considered new matter.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. **Claims 3-5** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In particular, Applicants in their specification fail to structurally distinguish “coolant flow guide vanes” and “guide taps” as claimed in claims 3-5 through lines 3-4 of claim 3 and subsequently referred to throughout claims 3-5.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

1. ***Claims 1-3*** are rejected under 35 U.S.C. 102(b) as being anticipated by Oh et al (US 2005/0105677 A1).

Oh et al teach (title, abstract, Figures 1-3 and cols. 1, 2, 5, 6, 7, 8 and 9) a spacer grid 2 (col. 5, l. 55-63) for placing and supporting a plurality of longitudinal fuel rods 106 (col. 1, l. 19) in a nuclear reactor fuel assembly (first sentence of the abstract), comprising

a plurality of inner strips 113 (col. 1, l. 26-28) intersecting each other to form a plurality of guide tube cells 108 (col. 1, l. 30-31) to receive guide tubes 103 (col. 1, l. 18-19) therein (see Figure 1) and

a plurality of fuel rod cells 8 or 108 (col. 1, l. 29-30 and col., col. 6, l. 22) to receive the fuel rods 6 or 106 (col. 1, l. 35-36 and col. 6, l. 44-46) therein, with a plurality of mixing blades 32 (col. 7, l. 1-14) projecting upward from the inner strips at intersections of the inner strips (Figures 5-6, 8 and 9); and

a plurality of perimeter strips (outer strips 113; loc.cit.) each of which comprises a plurality of cell walls including intermediate cell walls and corner cell walls (necessarily

so, as all intermediate strips are included in their interior), the perimeter strips (as the outer strips necessarily) encircling the intersecting inner strips and the corner cell walls forming outermost corner cells of the spacer grid (because they are cells at the corners),

with a grid spring 12/13/14 (col. 6, l. 7-10) provided on each of the cell walls, the grid spring comprising (see Figures 5 and 6):

a vertical opening 13 or 14 (col. 6, l. 7-10) formed at a central area of each of the cell walls;

a vertical support part (un-numbered trapezoid shaped end portions abutting said vertical opening on both bottom and top sides thereof) extending vertically in the vertical opening between top and bottom edges of the vertical opening (any structure abutting an opening can be said to extend in said opening); and

a fuel rod support part 12 (col. 6, l. 7-10) provided at a central portion of the vertical support part (namely: in between said vertical support part top and bottom portions), the fuel support part being bent (col. 6, l. 42-44) and thereby having the capability of providing a conformal support surface conformal to a fuel rod supported by the grid spring.

In conclusion, Oh et al anticipate claim 1.

On claim 2: the vertical support part is bent at two steps along substantially horizontal bending lines (Figures 5 and 8) (said horizontal lines are the dividing lines between 12 and said vertical support parts), and the fuel rod

support part 12 is bent to be conformal with the fuel rods 106 (being parallel to said fuel rods 106; see Figure 2), thus accomplishing a uniform contact pressure distribution when the fuel rod support part is in contact with each of the fuel rods (the latter limitation is automatically met as a result of the former limitations because contact along parallel, substantially vertical faces implies said latter limitation).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claim 3** is rejected under 35 U.S.C. 103(a) as being unpatentable over Oh et al (as applied to claim 1 above) in view of De Mario et al (5,303,276).

Please note the indefinite nature of claim 3 as explained above under Claim Rejections under 35 USC 112, second paragraph, under which proviso the following rejection is offered according to examiner's best understanding of the claimed subject matter.

As detailed above, Oh et al anticipate claim 1. Further according to Oh et al, each of the intermediate cell walls has a coolant flow guide vane 30 (i.e., longer one of two structures 30 shown in the upper portion of Figure 9) and a guide tap (shorter one of two structures 30 shown in an upper portion of Figure 9) on an upper edge thereof (col. 7, l. 1-14 and Figure 9) such that a plurality of

coolant flow guide vanes and a plurality of guide taps are alternately arranged (col. 7, l. 33-39) along an upper edge of each of the intermediate cell walls (loc.cit. and Figure 14 and col. 7, l. 15-24)., Oh et al do not necessarily teach the further limitation that "each of the corner cell walls having either a coolant flow guide vane or guide tap on an upper edge thereof to complete an alternate arrangement of the coolant flow guide vanes and guide taps". However, it would have been obvious to include said further limitation in view of De Mario et al, who teach upper and lower edges of the perimeter strips, and hence also of corner cell walls to have guide/protective/flow taps or vanes of different geometric dimensions bent inwardly in an alternating arrangement (Figure 3 in De Mario et al; see element 320 and col. 8, l. 16-28), incorporation of the teaching in this regard by Mario et al thus completing an alternate arrangement of coolant flow guide vanes and guide tapes in cooperation with the intermediate cell walls. *Motivation* to include the teaching by Mario et al in the invention by Oh et al derives immediately from the noted advantage by De Mario et al that the inventive arrangement by De Mario et al succeeds in providing single-phase coolant flow distributed over each fuel rod even at high heat flux (col. 5, l. 19-24).

On claim 4: Furthermore, although Oh et al do not necessarily teach the further limitation as defined by claim 4 it would have been obvious to include said further limitation in view of De Mario et al, who teach each of the intermediate cells walls to have downwardly projecting guide taps (downward protrusions thereof as shown in Figure 3) at both corners (i.e., at both the left and right

corner adjacent lattice members 310 of each intermediate cell walls and each of the plurality of corner cell walls has a guide tap projecting downward on a lower edge of each of the corner cell walls (see element 330 in Figure 3 of De Mario and col. 8, l. 28-34). *Motivation* to include the teaching by Mario et al in the invention by Oh et al derives immediately from the noted advantage by De Mario et al that the inventive arrangement by De Mario et al succeeds in providing single-phase coolant flow distributed over each fuel rod even at high heat flux (col. 5, l. 19-24).

3. **Claim 5** is rejected under 35 U.S.C. 103(a) as being unpatentable over Oh et al and De Mario et al as applied to claim 3 above, and further in view of Delafosse et al (4,224,107).

As detailed above, claim 3 is unpatentable over Oh et al in view of De Mario et al. Furthermore, each of the coolant (flow guide) vanes in Oh et al is bent toward a center of the spacer grid because each of said coolant vanes is shown, – and in order to cause a swirl of the coolant fluid: must be, bent in two orthogonal directions so as to cause a swirl, i.e., a rotation of the fluid (see Figures 8 and 9 and col. 7, l. 1-68). Said two directions span a plane. The vector connecting each coolant flow guide vane with a center of said spacer grid toward a center of the spacer grid (as opposed to *the* center of said spacer grid (the latter may not even exist, in the case when the number of cells in either a row or a column is even), as any center of any element qualifies to be a center of said spacer grid). Furthermore, it is noted that Oh et al teach elements 30 to be “bent

towards the center of the main flow path" (col. 7, l. 1-14), which center, when said flow path is taken as a whole, is substantially identical to the center in a horizontal cross section of the spacer grid. Oh et al also show a width of each of said guide vanes reducing from a position at which each of said guide vanes is initially bent (see Figure 6), showing a tapered shape (loc.cit.).

Oh et al do not necessarily teach the further limitation that a peak of each of the guide vanes to be rounded. However, they do indicate that its specific shape is a matter of design choice because said shape can be chosen "in accordance with a desired swirl flow" (col. 7, l. 44-49). Furthermore, it would have been obvious to include said further limitation in view of Delafosse et al, who teach the rounding of protrusions 9 over cell walls 2 and 3 (hence structurally analogous to protrusions 30 of Oh et al), where the rounding is to as to avoid jamming (col. 3, l. 12-20). Motivation to include the teaching by Delafosse et al immediately derives from the advantage of the avoidance of jamming.

Response to Arguments

Applicant's arguments filed 10/24/05 have been fully considered but they are not persuasive. In particular, despite substantial amendment to the claims at least some of the prior art made of record still meets the claim limitations of claims 1 and 2 and renders those of claims 3-5 obvious. Newly added claims introduced new matter as explained in the above rejections under 35 USC 112, first paragraph.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Johannes P. Mondt whose telephone number is 571-272-1919. The examiner can normally be reached on 8:00 - 18:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack W. Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JPM
December 11, 2005

Patent Examiner:

A handwritten signature in black ink, appearing to be 'JPMondt', with a stylized flourish at the end.

Johannes Mondt (Art Unit: 3663)